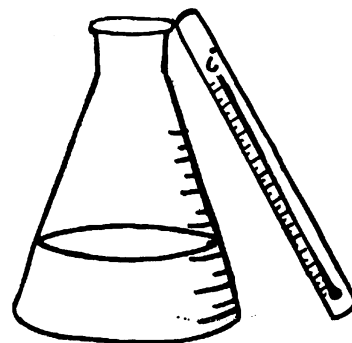


WATER QUALITY

Post-Visit Activity

Activity	Water Quality Monitoring
Adapted From	A Ribbon of Life: New River Watershed
Setting	Classroom
Duration	45-60 minutes
Subject Areas	Science, Math, Resource Management
Skills	Data collecting, Recording data, Equipment usage
Grade Level	2-3



Objective:

Students will be able to perform water quality tests.

WV-IGOs:

Science - 2.28, 2.23, 3.21, 3.28, 3.41, 3.60

BACKGROUND

The quality of our water is affected by the type and amount of pollutants that enter the water. Poor water quality over an extended period will result in the death of the water resource. To maintain a healthy river, we must ensure the optimal range for the health and vitality of the native species. By monitoring water quality, we can determine the conditions that are suitable for the survival of aquatic species and for the safe use of water by humans.

VOCABULARY

water quality	turbidity
dissolved oxygen	nitrates
temperature	phosphates
pH	fecal coliform

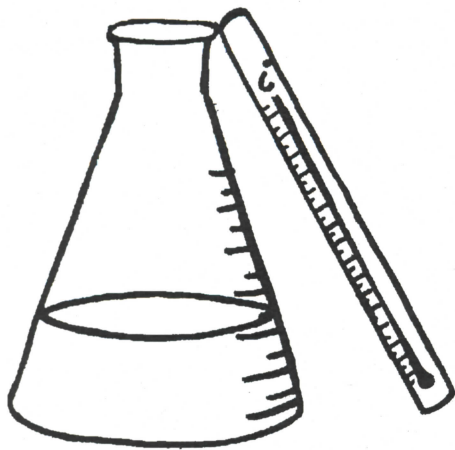
MATERIALS

1. water quality monitoring log
2. thermometer
3. pH indicator paper
4. clear plastic jars filled with water collected from one or more area creeks or the New River
5. pencil

PROCEDURES

1. Discuss with students the meaning of water quality and the importance of water quality monitoring. Explain that the tests they will be doing are the ones that the National Park Service performs to monitor water quality.
2. The students should have prior knowledge of pH and clarity from the vocabulary activities, but they may need to review these terms before testing.
3. Divide the class into groups of four and give each group a plastic jar of water to test, a log sheet, pH paper, and thermometer.
4. Assign each of the students one of the following jobs:
1) Recorder, 2) Temperature, 3) pH, and 4) Clarity.





PROCEDURES *Continued*

5. Demonstrate how each test is to be performed and how to read the data (see Resource Page, "Water Quality Monitoring"). After each test is completed, the student is to report to the recorder the data to record on the log.
6. Once the groups have completed the tests and log sheets, discuss the importance of monitoring water quality and its effects on the environment. Suggested discussion questions:
 - a. Why is water quality monitoring important?
 - b. What would happen if water quality was not monitored?
 - c. How can you help to ensure good water quality?

EVALUATION

Completion of the log sheet will show that students completed the activity.

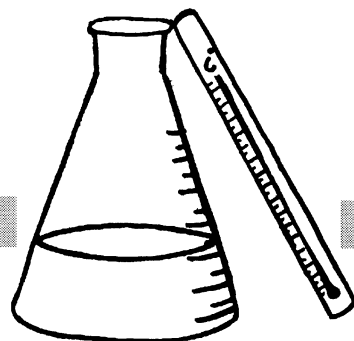
EXTENSION

Contact the National Park Service at New River Gorge National River to set up a field trip to an area river where students can assist a park ranger in collecting water samples and performing water quality tests.



WATER QUALITY

Resource Page



Water Quality Monitoring

Water quality is affected by many different activities, such as construction, logging, agriculture, industry, town and community development, and so forth. The monitoring of water quality is necessary for establishing baseline conditions within a river or stream. It also will provide a method of determining significant changes, temporary or long-term, in water quality. Water quality tests can be conducted to measure the level of dissolved oxygen, pH, temperature, nitrates and phosphates, turbidity, and fecal coliform in water.

Water quality means that the quality of the water in a stream, river, pond, lake, wetland, or that of ground water is such that it can support aquatic life and beneficial uses.

Beneficial uses include water for:

- drinking
- agriculture
- wildlife management
- bathing
- transportation
- industry
- power production
- recreation

pH

pH quantifies the acidity or alkalinity of water. Pure water has a pH of 7.0 and is neutral. Below 7.0 is acidic and above 7.0 is alkaline or basic. Most aquatic organisms prefer conditions with pH values ranging from 6.5 to 8.5. Water pH levels fluctuate over time as a result of bacterial activity, photosynthesis, water turbulence, chemicals in run-off flowing into the water, and acid drainage from coal mines and acid rain. The pH of the water is critical to the survival of most aquatic plants and animals. Many species have trouble surviving if pH drops below 5.0 or rises above 9.0.

pH test

Remove one pH indicator paper from the box and hold the colored squares into the water sample until the squares no longer change color. This could take several minutes. Remove the pH strip from the water and compare the resultant color with the color segments printed on the pH indicator box. Match the pH strip to the closest matching color on the box to establish the pH level of the water sample. Report the results to the recorder to write on the log sheet.



H₂O clarity (turbidity)

Turbidity measures the clarity of water. Often we think of clean water as being clear, but even polluted water can have suspended particles that lessen its clarity but do not diminish its quality. These suspended particles may be silt, soil particles, or minute pieces of dead plants. Natural runoff and water turbulence can cause turbidity of the water. Human activities such as erosion and runoff from agricultural fields, timber lands, and construction sites also contribute to water turbidity. High levels of turbidity can greatly decrease penetration of sunlight through the water needed for photosynthesis. Many animals feed by filtering the water. Large amounts of suspended matter can foul their filter-feeding system. Particles may accumulate on the gills of fish and inhibit breathing.

H₂O clarity (turbidity) test

With the lid on the jar of water, shake the jar gently several times to mix the solution. View through the jar to check the clarity of the water and report it to the recorder to record on the log sheet. Clarity (turbidity) levels are listed on the log sheet.

H₂O temperature

Water temperature variations can affect the amount of dissolved oxygen in the water. Warmer water cannot hold as much oxygen as cold water. This diminishes the water's capability to support life because dissolved oxygen in the water is crucial for the survival of most plants and animals.

H₂O temperature test

Hold a thermometer in the water sample for approximately 2 minutes. Remove the thermometer from the water and read the temperature. Report your data to the recorder to record on the log sheet.

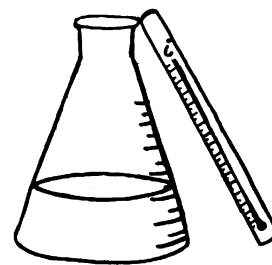


WATER QUALITY

Monitoring Log

Directions

Complete the following log based on your test of the collected water samples.



Site	Date	Time	H ₂ O Temperature	pH	Clarity (turbidity)

Clarity (turbidity) Legend

Clear = same as tap water

Cloudy = slight discoloring of water

Murky = 50% or less visibility through water

Muddy = little or no visibility through water



TEACHER NOTES

